ISLAND PARK VILLAGE (PWS 7220037)
SOURCE WATER ASSESSMENT OPERATOR DRAFT REPORT

February 25, 2003

State of Idaho
Department of Environmental Quality

Executive Summary

Under the Safe Drinking Water Act Amendments of 1996, all states are required by the U.S. Environmental Protection Agency (EPA) to assess every source of public drinking water for its relative sensitivity to contaminants regulated by the Act. This assessment is based on a land use inventory of the designated source water assessment area and sensitivity factors associated with the well and aquifer characteristics.

This report, *Source Water Assessment for the Island Park Village, Island Park, Idaho*, describes the public drinking water systems (PWSs), the boundaries of the zones of water contribution, and the associated potential contaminant sources located within these boundaries. This assessment should be used as a planning tool, taken into account with local knowledge and concerns, to develop and implement appropriate protection measures for this source. **The results should <u>not be</u> used as an absolute measure of risk and they should <u>not be</u> used to undermine public confidence in the water system.**

The Island Park Village drinking water system (PWS #7220037) is a non-transient, non-community system that consists of two wells. Both wells have high susceptibility to all potential contaminant categories: inorganic chemical (IOC) contaminants, volatile organic chemical (VOC) contaminants, synthetic organic chemical (SOC) contaminants, and microbial contaminants. According to the 1999 Ground Water Under Direct Influence (GWUDI) field survey, an unlined pond is located within 50 feet of Well #1 and an access road runs within 50 feet of Well #2. Both of these contaminant sources impinge within the sanitary setback (a 50-foot radius) of the wells, resulting in automatic high overall susceptibility. If the pond were moved and if the road was diverted or rerouted to areas that were 50 feet or greater from the wellheads, the susceptibility of the wells would be reduced to moderate.

Total coliform bacteria were detected in the distribution system periodically from March 1995 to March 2000, with confirmed detections in March and July 1995 and June 1998. A repeat detection of fecal *E.coli* bacteria was also recorded in the distribution system in March 1995. However, no bacteria have been detected at either of the Island Park Village wells.

No SOCs or VOCs have been detected in the water system. The IOCs chromium, beryllium, fluoride, nitrate, and sodium were detected in both wells but at levels far below the maximum contaminant levels (MCLs) set by the EPA. However, Fremont county (the county in which the wells are located) has been rated as high for nitrogen fertilizer use, herbicide use, and total agricultural chemical use.

This assessment should be used as a basis for determining appropriate new protection measures or re-evaluating existing protection efforts. No matter what ranking a source receives, protection is always important. Whether the source is currently located in a “pristine” area or an area with numerous industrial and/or agricultural land uses that require surveillance, the way to ensure good water quality in the future is to act now to protect valuable water supply resources.

For the Island Park Village's drinking water system, water protection activities should focus on correcting any deficiencies outlined in the sanitary surveys (inspections conducted every five years with the purpose of determining the physical condition of a water system's components and its capacity). Also, if microbial contamination becomes a problem, disinfection practices should be implemented. No chemicals should be stored or applied within the 50-foot radius of the wellheads. The Island Park Village may need to consider reducing the size of the pond that is located within 50 feet of Well #1 and diverting or limiting the access to the road that runs within 50 feet of Well #2 to avoid contamination associated with the pond and the corridor. Additionally, there should be a focus on the implementation of practices aimed at reducing the leaching of agricultural chemicals within the designated source water areas and awareness of the potential contaminant sources within the delineation zones. Since much of the designated protection areas are outside the direct jurisdiction of the Island Park Village, collaboration and partnerships with state and local agencies, and industry groups should be established and are critical to the success of drinking water protection.

Due to the time involved with the movement of ground water, drinking water protection activities should be aimed at long-term management strategies even though these strategies may not yield results in the near term. A strong public education program should be a primary focus of any drinking water protection plan as the delineation areas are near residential land uses. There are multiple resources available to help communities implement protection programs, including the Drinking Water Academy of the EPA.

A community must incorporate a variety of strategies in order to develop a comprehensive drinking water protection plan, be they regulatory in nature (e.g. zoning, permitting) or non-regulatory in nature (e.g. good housekeeping, public education, specific best management practices). For assistance in developing protection strategies please contact the Idaho Falls Regional Office of the Idaho Department of Environmental Quality or the Idaho Rural Water Association.

SOURCE WATER ASSESSMENT FOR THE ISLAND PARK VILLAGE, ISLAND PARK, IDAHO

Section 1. Introduction - Basis for Assessment

The following sections contain information necessary to understand how and why this assessment was conducted. **It is important to review this information to understand what the rankings of this assessment mean.** Maps showing the delineated source water assessment area and the inventory of significant potential sources of contamination identified within that area are attached. The list of significant potential contaminant source categories and their rankings used to develop the assessment is also included.

Background

Under the Safe Drinking Water Act Amendments of 1996, all states are required by the EPA to assess every source of public drinking water for its relative susceptibility to contaminants regulated by the Safe Drinking Water Act. This assessment is based on a land use inventory of the delineated assessment area and sensitivity factors associated with the wells and aquifer characteristics.

Level of Accuracy and Purpose of the Assessment

Since there are over 2,900 public water sources in Idaho, there is limited time and resources to accomplish the assessments. All assessments must be completed by May of 2003. An in-depth, site-specific investigation of each significant potential source of contamination is not possible. **Therefore, this assessment should be used as a planning tool, taken into account with local knowledge and concerns, to develop and implement appropriate protection measures for this source. The results should <u>not be</u> used as an absolute measure of risk and they should <u>not be</u> used to undermine public confidence in the water system.**

The ultimate goal of the assessment is to provide data to local communities to develop a protection strategy for their drinking water supply system. The Idaho Department of Environmental Quality (DEQ) recognizes that pollution prevention activities generally require less time and money to implement than treatment of a public water supply system once it has been contaminated. DEQ encourages communities to balance resource protection with economic growth and development. The decision as to the amount and types of information necessary to develop a drinking water protection program should be determined by the local community based on its own needs and limitations. Wellhead or drinking water protection is one facet of a comprehensive growth plan, and it can complement ongoing local planning efforts.

Section 2. Conducting the Assessment

General Description of the Source Water Quality

The public drinking water system for the Island Park Village is comprised of two ground water wells that serve approximately 151 people through 50 connections. Situated in Fremont County, the wells are located near the Island Park Golf Course approximately one-quarter of a mile east of Highway 20 (Figure 1).

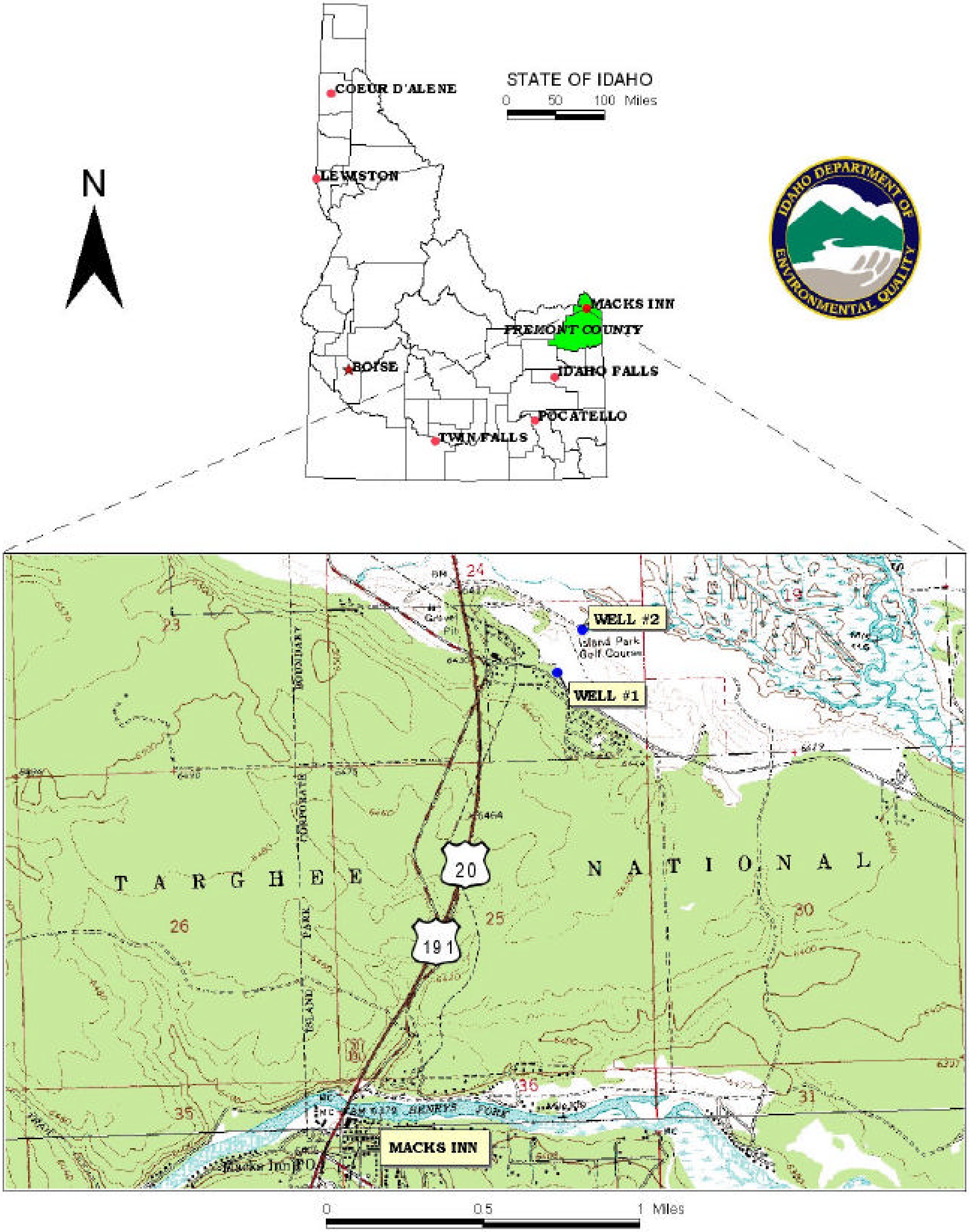
There are no current significant potential water problems affecting the Island Park Village drinking water system. Total coliform bacteria were detected in the distribution system periodically from March 1995 to March 2000, with confirmed detections in March and July 1995 and June 1998. A repeat detection of fecal *E.coli* bacteria was also recorded in the distribution system in March 1995. However, no bacteria have been detected at either of the Island Park Village wells.

No SOCs or VOCs have been detected in the water system. The IOCs chromium, beryllium, fluoride, nitrate, and sodium were detected in both wells but at levels far below the maximum contaminant levels (MCLs) set by the EPA. However, Fremont county (the county in which the wells are located) has been rated as high for nitrogen fertilizer use, herbicide use, and total agricultural chemical use.

Defining the Zones of Contribution – Delineation

The delineation process establishes the physical area around a well that will become the focal point of the assessment. The process includes mapping the boundaries of the zone of contribution into time-of-travel (TOT) zones (zones indicating the number of years necessary for a particle of water to reach a well) for water in the aquifer. DEQ contracted with Washington Group, International (WGI) to perform the delineations using a refined computer model approved by the EPA in determining the 3-year (Zone 1B), 6-year (Zone 2), and 10-year (Zone 3) TOT zones for water associated with the Island Park hydrologic province aquifer in the vicinity of the wells of the Island Park Village. The computer model used site specific data, assimilated by WGI from a variety of sources including the Island Park Village operator input, local area well logs, and hydrogeologic reports (detailed below).

FIGURE 1. Geographic Location of Island Park Village



Hydrogeologic Conceptual Model

The Island Park hydrologic province contains 361 square miles, with 95 percent of the total area located in Fremont County and 5 percent located in Clark County. The entire hydrologic province is within the upper Henrys Fork basin. The upper Henrys Fork basin comprises 1,070 square miles at the eastern end of the Snake River Plain. The Snake River Plain is a downwarped feature extending in an arc across southern Idaho and into Wyoming. As the basin was being downwarped, volcanism and sedimentation filled it with basalt, rhyolite, and sedimentary deposits (Whitehead, 1978, p. 9). The basin has a mean altitude of about 6,700 feet above mean sea level (msl) and has one of the coldest climates in Idaho (Whitehead, 1978, p. 4). The dominant surface water features are the Henrys Fork of the Snake River, Henrys Lake, and Island Park Reservoir. The Henrys Fork originates at the outlet of Henrys Lake in the northern part of the basin. The lake, originally a natural feature and fairly shallow, was expanded in 1922 by construction of a low dam. From the lake, the river flows southward and westward to Island Park Reservoir, which was constructed in 1936 (Whitehead, 1978, p. 4). The basin also contains numerous springs, two of which (Big Springs and Warm River Springseach discharge more than 90,000 gallons of water per minute. The springs issue chiefly from volcanic rocks and are the source of many streams in the area (Whitehead, 1978, p. 15).

During Cenozoic time, a large shield volcano formed in the south-central part of the basin. This volcano later collapsed, forming the Island Park caldera. Subsequent flows covered the eastern caldera rim and overlapped flows from the collapsed volcano. At about the same time, basalt flows occurred southeast of the caldera along the southern part of the study area (Whitehead, 1978, p. 9). Glaciers that scoured the highlands in late Pleistocene time provided glacial outwash to the valleys and stream channels, while basalt of the Snake River Group flowed from vents south and west of the caldera and covered some of the rhyolitic ash flows. Rhyolitic lava and ash flows of the Yellowstone Group were deposited at the same time as the glacial outwash and basalt flows of the Snake River Group. The most recent flows (Plateau Rhyolite) issued from vents north and east of the caldera, covering much of the eastern part of the upper Henrys Fork basin (Whitehead, 1978, p. 9).

Because of the lack of data, the subsurface distribution of geologic units is defined generally and for only parts of the basin. Driller's logs are the chief source of subsurface information, and most wells were drilled near stream channels in alluvial deposits, so the thickness of the alluvium is better defined than that of other geologic units (Whitehead, 1978, p. 10).

A 1975 gravity survey indicates that the alluvial fill in the elongate valley of Henrys Lake is 3,600 feet or more thick (Whitehead, 1978, p. 10). Volcanic and sedimentary rocks from adjacent highlands form the alluvial fill, which is thickest near the southern end of Henrys Lake and thins toward the edges of the valley. A well that was drilled about 2 miles northwest of Henrys Lake near the north end of the valley bottomed in alluvium at 186 feet. In the southern end of the valley near Big Springs, the alluvium is less than 100 feet thick and only a few feet thick in many places (Whitehead, 1978, p. 10).

All geologic units within the basin contain some ground water (Whitehead, 1978, p. 11). Most of the ground water is under unconfined conditions. Few wells are known to penetrate confined aquifers (Whitehead, 1978, p. 11). The more productive aquifers are unconfined alluvial and glacial material, particularly sand and gravel along stream channels (Whitehead, 1978, p. 11). The productivity of the basalt aquifers is highly variable, but large yields can be obtained if sufficient fracture zones are penetrated by the wells. The rhyolitic ash flows yield sufficient quantities of water for domestic purposes, but large yields are generally limited to places where the flows are highly permeable (Whitehead, 1978, p. 11).

In general, ground water throughout the basin moves southward through the valley parallel to flow in Henrys Fork. In the permeable valley fill south of Henrys Lake, the water-table gradient is about 50 feet per mile (ft/mile) (0.009; Whitehead, 1978, Figure 5).

Mean annual precipitation on the upper Henrys Fork basin, much of which falls as snow, is estimated to be about 35 inches (Whitehead, 1978, p. 4). Of that amount, about 50 percent contributes to discharge in the Henrys Fork of the Snake River (Whitehead, 1978, p. 45) and approximately 17 inches per year is lost to evaporation (Whitehead, 1978, p. 30). This leaves 0.5 inch per year (in/yr) as the maximum amount of precipitation that is available to recharge the aquifer. The Plateau Rhyolite, located along the eastern margin of the basin, is highly permeable—particularly in its upper 100 feet or in highly fractured zones—and may contribute to ground water recharge. The lack of well-defined surface drainage on the rhyolite and the presence of large springs at its base further suggest that rainfall and snowmelt infiltrate rapidly and little runoff and evapotranspiration occurs (Whitehead, 1978, p. 10).

Analysis of specific capacity data from wells within the basin yields transmissivity values ranging from 640 to 3,000 square feet per day (ft2/day) for alluvium, 200 to 8,700 ft2/day for basalt, and 400 to 12,000 ft2/day for rhyolite (Whitehead, 1978, p. 12).

Discharge measurements were made along the Henrys Fork in the fall of 1975 during base flow conditions to determine if certain reaches were either gaining or losing to ground water. In general, the measurements indicated that there was no significant stream loss to the ground water from the Henrys Fork (Whitehead, 1978, p. 25). The few reaches that showed substantial gains are downstream from the modeled area.

The Island Park hydrologic province boundaries are well defined to the north/northeast and west of the PWS wells and consist of pre-Cenozoic rocks of the Black Mountain Range and the Red Rock Mountain Range, respectively. South of the PWS wells, the valley opens to relatively flat terrain and has no obvious hydrologic boundary.

Refined Method

The analytic element model WhAEM2000 (Kraemer et al., 2000) was used to delineate 3-, 6-, and 10-year capture zones for PWS wells located within the Island Park hydrologic province. The method used for delineating hydraulic capture zones contains four main elements: Model Input Determination, Model Calibration, Sensitivity Analysis, Factor of Safety Determination.

Aquifer properties were determined based on evaluation of site-specific data and literature review. The pumping rate for Well #2 is 1.5 times the average daily pumping rate. The pumping rate for Well #1 is the same as that for Well #2 because Well #1 serves as the backup water supply. The hydraulic conductivity is based on initial calibration efforts using a range of 7 to 214 ft/day. This range was calculated using published transmissivity values for rhyolite (400 to 12,000 ft2/day) and an aquifer thickness of 56 feet. The effective porosity is 0.2. This is the default value for mixed volcanic and sedimentary rocks, primarily volcanic rocks, presented in Table F-3 of the Idaho Wellhead Protection Plan (IDEQ, 1997, p. F-6). Base elevation corresponds to the total depth of the deepest PWS well (Well #2). The aquifer thickness of 56 feet is the average open interval for 15 USGS wells that are completed in rhyolite within the model area. The initial recharge value of 0.5 in./yr (0.00011 ft/day) was calculated by subtracting discharge to Henrys Fork (17.5 inches) and evaporation (17 inches) from the annual average precipitation of 35 in./yr. (Whitehead, 1978, pp. 4, 27, 30). This recharge value was increased to 0.00025 ft/day during model calibration.

Well #2 serves as the primary well and was originally drilled to 160 feet in 1975, then deepened to 207 feet in 1998. The borehole diameter is 6 inches. The driller's log indicates that the water-bearing units are gravel and sand and "broken rhyolite." Well #1 is designated as the auxiliary or backup well for the system (IDEQ, 1987). This well's 8-inch-diameter borehole extends 145 feet below ground surface (ft-bgs), and the casing extends to 56 ft-bgs. The well log indicates completion in shale, with a saturated interval of 89 feet.

The delineated source water assessment areas for the wells of the Island Park Village can best be described as northeast trending corridors that extend approximately 1.5 miles ending near Crooked Creek in the 10-year TOT zone (Figure 2 and Figure 3). The actual data used by WGI in determining the source water assessment delineation areas are available from DEQ upon request.

FIGURE 2. Island Park Village Delineation Map and Potential Contaminant Source Locations

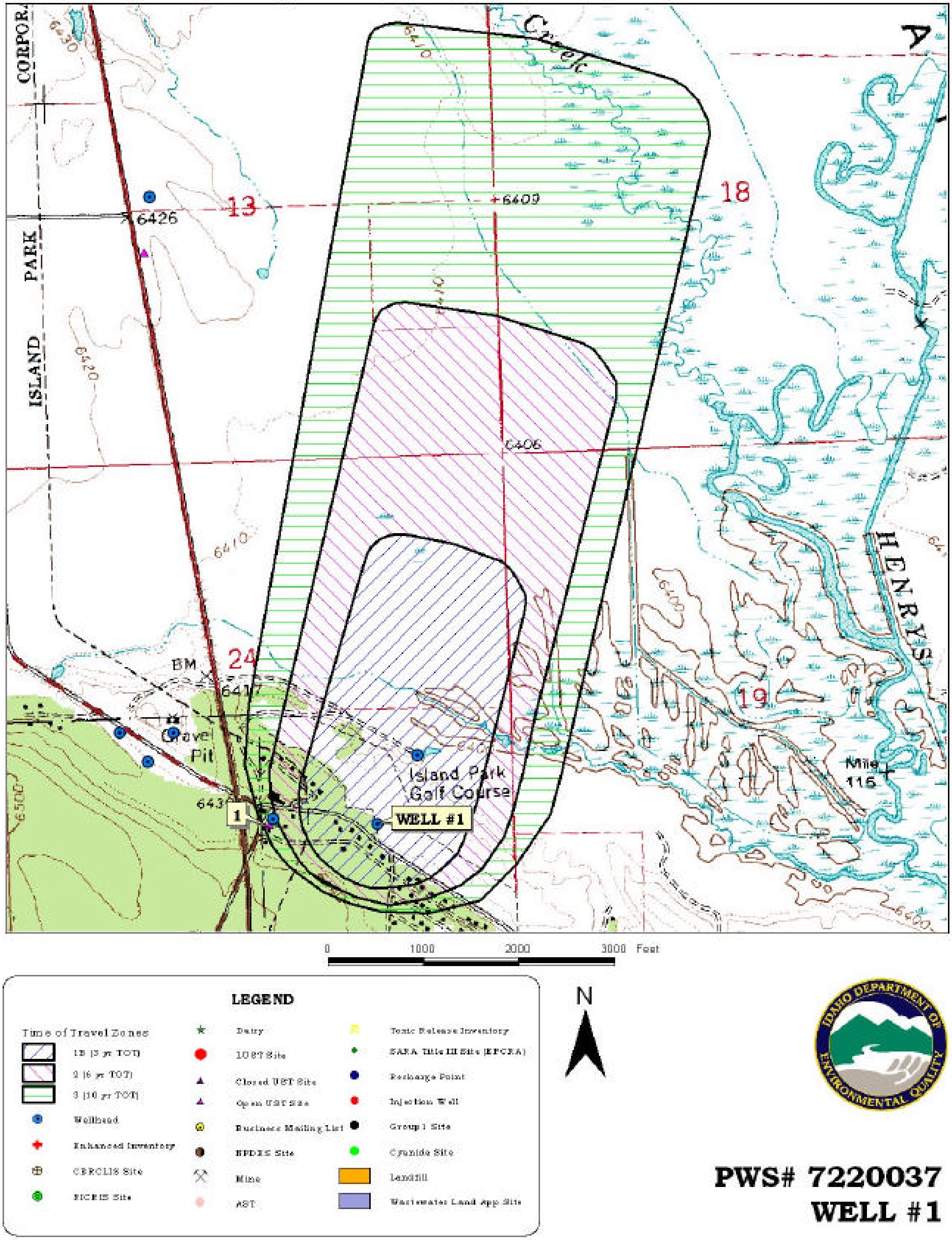
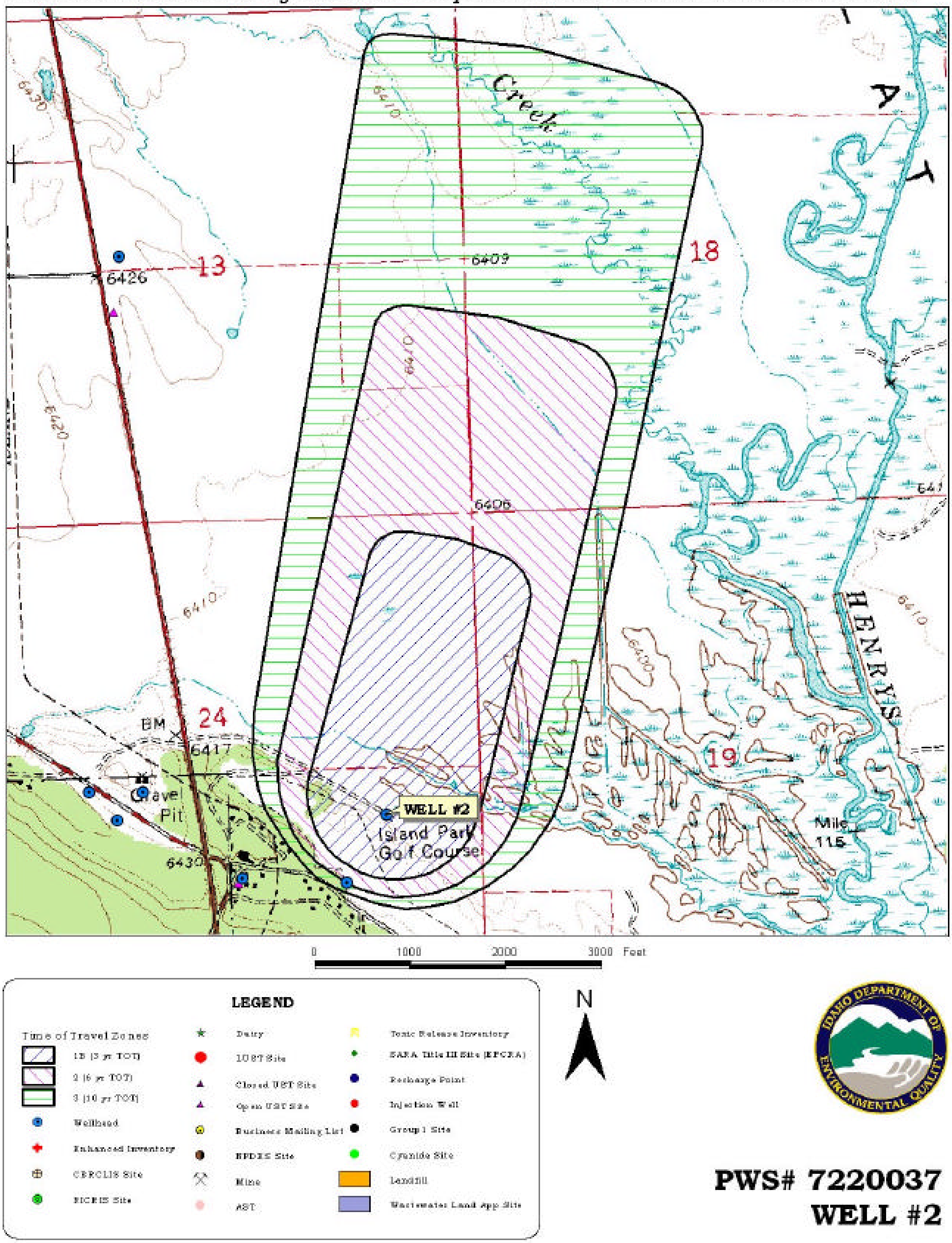


FIGURE 3. Island Park Village Delineation Map and Potential Contaminant Source Locations



PWS# 7220037
WELL #2

Identifying Potential Sources of Contamination

A potential source of contamination is defined as any facility or activity that stores, uses, or produces, as a product or by-product, the contaminants regulated under the Safe Drinking Water Act and others, such as *cryptosporidium*, and has a sufficient likelihood of releasing such contaminants at levels that could pose a concern relative to drinking water sources. The goal of the inventory process is to locate and describe those facilities, land uses, and environmental conditions that are potential sources of groundwater contamination. The locations of potential sources of contamination within the delineation areas were obtained by field surveys conducted by DEQ and from available databases.

Land use within the immediate area of the Island Park Village is mostly rangeland or undeveloped land use and the surrounding area of wells of the Island Park Village consists of irrigated agriculture and rangeland.

It is important to understand that a release may never occur from a potential source of contamination provided they are using best management practices. Many potential sources of contamination are regulated at the federal level, state level, or both to reduce the risk of release. Therefore, when a business, facility, or property is identified as a potential contaminant source, this should not be interpreted to mean that this business, facility, or property is in violation of any local, state, or federal environmental law or regulation. What it does mean is that the <u>potential</u> for contamination exists due to the nature of the business, industry, or operation. There are a number of methods that water systems can use to work cooperatively with potential sources of contamination, including educational visits and inspections of stored materials. Many owners of such facilities may not even be aware that they are located near a public water supply well.

Contaminant Source Inventory Process

A two-phased contaminant inventory of the study area was conducted in September and October 2002. The first phase involved identifying and documenting potential contaminant sources within the Island Park Village Source Water Assessment Areas (Figure 2 and Figure 3) through the use of field surveys, computer databases, and Geographic Information System (GIS) maps developed by DEQ. The second, or enhanced, phase of the contaminant inventory involved contacting the operator to identify and add any additional potential sources in the areas.

The delineated source water areas encompass northeast trending corridors that extend for approximately 1.5 miles ending near Crooked Creek. A database search shows that an underground storage tank (UST) site is located within the delineation for Well #1 (Figure 2, Table 1). The GIS map shows that the delineations for both wells include an access road, the clubhouse road, and Crooked Creek (Figure 2 and Figure 3). Additionally, the 1999 GWUDI field survey indicates that a pond sits within 50 feet of Well #1 and that the access road runs within 50 feet of Well #2. A radius of 50 feet around the wellhead is known as the 1A zone or sanitary setback. Drinking water sources that have contaminants in this zone are considered highly vulnerable to contamination. Table 1 and Table 2 below list the potential contaminants within each delineated area.

Table 1. Well #1 of the Island Park Village, Potential Contaminant Inventory

Site #	Source Description[1]	TOT ZONE[2]	Source of Information	Potential Contaminants[3]
1	UST-Open	6 – 10	Database Search	VOC, SOC
	Access Road	0 – 10	GIS Map	IOC, VOC, SOC, Microbials
	Clubhouse Road	0 – 10	GIS Map	IOC, VOC, SOC, Microbials
	Crooked Creek	6 – 10	GIS Map	IOC, VOC, SOC
	Pond	0 – 3 (1A)	1999 GWUDI Survey	IOC, VOC, SOC, Microbials

[1] **UST = underground storage tank**

[2] **TOT = time-of-travel (in years) for a potential contaminant to reach the wellhead; 1A = sanitary setback of the well**

[3] **IOC = inorganic chemical, VOC = volatile organic chemical, SOC = synthetic organic chemical**

Table 2. Well #2 of the Island Park Village, Potential Contaminant Inventory

Site #	Source Description[1]	TOT ZONE[2]	Source of Information	Potential Contaminants[3]
	Access Road	0 – 10 (1A)	GIS Map, 1999 GWUDI Survey	IOC, VOC, SOC, Microbials
	Crooked Creek	6 – 10	GIS Map	IOC, VOC, SOC
	Clubhouse Road	6 – 10	GIS Map	IOC, VOC, SOC

[2] **TOT = time-of-travel (in years) for a potential contaminant to reach the wellhead; 1A = sanitary setback of the well**

[3] **IOC = inorganic chemical, VOC = volatile organic chemical, SOC = synthetic organic chemical**

Section 3. Susceptibility Analyses

Each well's susceptibility to contamination was ranked as high, moderate, or low risk according to the following considerations: hydrologic characteristics, physical integrity of the well, land use characteristics, and potentially significant contaminant sources (Table 3). Each of these three categories carries the same weight in the final assessment, meaning that a low score in one category coupled with higher scores in the other categories can still lead to a overall susceptibility of high. The susceptibility rankings are specific to a particular potential contaminant or category of contaminants. Therefore, a high susceptibility rating relative to one potential contaminant does not mean that the water system is at the same risk for all other potential contaminants. The relative ranking that is derived for each well is a qualitative, screening-level step that, in many cases, uses generalized assumptions and best professional judgement. Appendix A contains the susceptibility analysis worksheet for the system. The following summaries describe the rationale for the susceptibility ranking.

Hydrologic Sensitivity

The hydrologic sensitivity of a well is dependent upon four factors: the surface soil composition, the material in the vadose zone (between the land surface and the water table), the depth to first ground water, and the presence of a 50-foot thick fine-grained zone above the producing zone of the well. Slowly draining soils such as silt and clay typically are more protective of ground water than coarse-grained soils such as sand and gravel. Similarly, fine-grained sediments in the subsurface and a water depth of more than 300 feet protect the ground water from contamination.

Hydrologic sensitivity rates moderate for Well #2 and low for Well #1 (Table 3). The soils surrounding the area of the wellheads are in the poor to moderate-draining soil class, reducing the downward movement of contaminants to the aquifer. Additionally, the well logs indicate that there are enough slowly draining soils, such as clays and shales, above the producing zones of the wells to make up aquitards. However, the vadose zone for Well #2 consists mostly of sand. The vadose zone for Well #1 consists mostly of shale and clay.

First ground water for Well #1 was found between 70 feet and 80 feet below ground surface (bgs) and first ground water for Well #2 was found between 15 feet and 40 feet bgs.

Well Construction

Well construction directly affects the ability of the well to protect the aquifer from contaminants. System construction scores are reduced when information shows that potential contaminants will have a more difficult time reaching the intake of the well. Lower scores imply a system is less vulnerable to contamination. For example, if the well casing and annular seal both extend into a low permeability unit, then the possibility of contamination is reduced and the system construction score goes down. If the highest production interval is more than 100 feet below the water table, then the system is considered to have better buffering capacity. If the wellhead and surface seal are maintained to standards, as outlined in Sanitary surveys, then contamination down the well bore is less likely. If the well is protected from surface flooding and is outside the 100-year floodplain, then contamination from surface events is reduced.

Well #1 was drilled in 1975 to a depth of 145 feet bgs. It has a 0.250-inch thick, eight-inch diameter casing set to 56 feet bgs into "firm gray shale". The annular seal extends to 19 feet bgs into "broken gray shale". The static water level is at 30 feet bgs and the pump is set at 105 feet bgs. According to the well log, the casing is not screened or perforated.

Well #2 was also drilled in 1975 to a depth of 160 feet bgs and deepened in 1978 to 206 feet bgs. It has a 0.250-inch thick, eight-inch diameter casing set to 160 feet bgs into "gravel" and the annular seal extends to 19 feet bgs into "sand and gravel". The static water level is found at 30 feet bgs and the pump is set at 110 feet bgs. According to the well log, the casing is not screened or perforated.

For the system construction of the Island Park Village wells, Well #1 rated highly susceptible to contamination and Well #2 rated moderately susceptible to contamination. According to the 2001 sanitary survey, the wellhead and surface seals are maintained to standards for both wells. However, Well #1 does not have a casing vent. The purpose of the vent is to vent the space between the casing and the column and prevent a vacuum from forming when the well turns on and draws down the water table. A vacuum could draw in contamination through joints or leaks in the casing or cause the well to slough. The sanitary survey indicates that both wells are properly protected from surface flooding and are located outside a 100-year floodplain. However, the annular seals and casings for both wells do not extend to low permeability units that would protect the well from contamination. The highest producing zones are not 100 feet or deeper than the static water levels.

Though the wells may have been in compliance with standards when they were completed, current public water system (PWS) well construction standards are more stringent. The Idaho Department of Water Resources *Well Construction Standards Rules* (1993) require all PWSs to follow DEQ standards as well. IDAPA 58.01.08.550 requires that PWSs follow the *Recommended Standards for Water Works* (1997) during construction. These standards include provisions for well screens, pumping tests, and casing thicknesses to name a few. Table 1 of the *Recommended Standards for Water Works* (1997) lists the required steel casing thickness for various diameter wells. An 8-inch diameter casing requires a thickness of 0.322 of an inch. Both wells did not meet well construction standards and therefore, were assessed an additional point in the system construction rating.

Potential Contaminant Source and Land Use

Well #1 of the Island Park Village rates moderate for IOCs (e.g. nitrates arsenic), VOCs (e.g. petroleum products), and SOCs (e.g. pesticides) and it rates low for microbial contaminants (e.g. bacteria). Well #2 rates low for IOCs, VOCs, SOCs, and microbial contaminants. The clubhouse road extends through the 3-year, 6-year, and 10-year TOT zones of the Well #1 delineation whereas it only extends through the 10-year TOT zone of the Well #2 delineation. This road contributed to the potential contaminant source/land use of Well #1. Though both delineations crossed irrigated land, it was in the 10-year TOT zones. The predominant rangeland in the 3-year and 6-year TOT zones of the delineations reduced the land use scores for both wells.

Final Susceptibility Ranking

A detection above a drinking water standard MCL, any detection of a VOC or SOC at the well, or a confirmed detection of total coliform bacteria or fecal coliform bacteria at the wellhead will automatically give a high susceptibility rating to a well despite the land use of the area because a pathway for contamination already exists. Additionally, if there are contaminant sources located within 50 feet of the source then the wellhead will automatically get a high susceptibility rating. According to the 1999 GWUDI field survey, a pond sits within 50 feet of Well #1 and an access road runs within 50 feet of Well #2, resulting in automatic high susceptibility ratings to all potential contaminant categories for both wells. Hydrologic sensitivity and system construction scores are heavily weighted in the final scores. Having multiple potential contaminant sources in the 0- to 3-year time of travel zone (Zone 1B) and agricultural land contribute greatly to the overall ranking. In terms of total susceptibility, both wells rated automatically high for all potential contaminant categories.

Table 3. Summary of Island Park Village Susceptibility Evaluation

Well	Susceptibility Scores[1]									
	Hydrologic Sensitivity	Contaminant Inventory				System Construction	**Final Susceptibility Ranking**			
		IOC	VOC	SOC	Microbials		IOC	VOC	SOC	Microbials
Well #1	L	M	M	M	L	H	H*	H*	H*	H*
Well #2	M	L	L	L	L	M	H*	H*	H*	H*

[1]H = High Susceptibility, M = Moderate Susceptibility, L = Low Susceptibility,
IOC = inorganic chemical, VOC = volatile organic chemical, SOC = synthetic organic chemical
*** = Automatic high susceptibility score due to a pond that sits within 50 feet of Well #1 and an access road that runs within 50 feet of Well #2.**

Susceptibility Summary

Overall, both wells have high susceptibility to all potential contaminant categories: IOC contaminants, VOC contaminants, SOC contaminants, and microbial contaminants. According to the 1999 GWUDI field survey, an unlined pond is located within 50 feet of Well #1 and an access road runs within 50 feet of Well #2. Both of these contaminant sources impinge within the sanitary setback (a 50-foot radius) of the wells, resulting in automatic high overall susceptibility. If the pond were moved and if the road was diverted or rerouted to areas 50 feet or greater from the wellheads, the susceptibility of the wells would be reduced to moderate.

Total coliform bacteria were detected in the distribution system periodically from March 1995 to March 2000, with confirmed detections in March and July 1995 and June 1998. A repeat detection of fecal *E.coli* bacteria was also recorded in the distribution system in March 1995. However, no bacteria have been detected at either of the Island Park Village wells.

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Section 4. Options for Drinking Water Protection

The susceptibility assessment should be used as a basis for determining appropriate new protection measures or re-evaluating existing protection efforts. No matter what the susceptibility ranking a source receives, protection is always important. Whether the source is currently located in a "pristine" area or an area with numerous industrial and/or agricultural land uses that require surveillance, the way to ensure good water quality in the future is to act now to protect valuable water supply resources.

An effective source water protection program is tailored to the particular local source water protection area. A community with a fully developed source water protection program will incorporate many strategies. For the Island Park Village's drinking water wells, water protection activities should focus on correcting any deficiencies outlined in the sanitary surveys. Also, if microbial contamination becomes a problem, disinfection practices should be implemented. No chemicals should be stored or applied within the 50-foot radius of the wellheads. The Island Park Village may need to consider reducing the size of the pond that is located within 50 feet of Well #1 and diverting or limiting the access to the road that runs within 50 feet of Well #2 to avoid contamination associated with the pond and the corridor. Additionally, there should be a focus on the implementation of practices aimed at reducing the leaching of agricultural chemicals within the designated source water areas and awareness of the potential contaminant sources within the delineation zones. Since much of the designated protection areas are outside the direct jurisdiction of the Island Park Village, collaboration and partnerships with state and local agencies, and industry groups should be established and are critical to the success of drinking water protection.

Due to the time involved with the movement of ground water, drinking water protection activities should be aimed at long-term management strategies even though these strategies may not yield results in the near term. A strong public education program should be a primary focus of any source water protection plan as the delineations are near to urban and residential land uses. There are multiple resources available to help communities implement protection programs, including the Drinking Water Academy of the EPA. As there are transportation corridors through the delineations, the Idaho department of transportation should be involved in protection activities. Drinking water protection activities for agriculture should be coordinated with the Idaho State Department of Agriculture, the Soil Conservation Commission, the local Soil Conservation District, and the Natural Resources Conservation Service.

A community must incorporate a variety of strategies in order to develop a comprehensive source water assessment protection plan, be they regulatory in nature (e.g. zoning, permitting) or non-regulatory in nature (e.g. good housekeeping, public education, specific best management practices). For assistance in developing protection strategies please contact the Idaho Falls Regional Office of the Idaho Department of Environmental Quality or the Idaho Rural Water Association.

Assistance

Public water supplies and others may call the following DEQ offices with questions about this assessment and to request assistance with developing and implementing a local protection plan. In addition, draft protection plans may be submitted to the DEQ office for preliminary review and comments.

Idaho Falls Regional DEQ Office	(208) 528-2650
State DEQ Office	(208) 373-0502

Website: http://www.deq.state.id.us

Water suppliers serving fewer than 10,000 persons may contact Melinda Harper (mlharper@idahoruralwater.com), Idaho Rural Water Association, at 1-208-343-7001 for assistance with drinking water protection (formerly wellhead protection) strategies.

POTENTIAL CONTAMINANT INVENTORY
LIST OF ACRONYMS AND DEFINITIONS

AST (Aboveground Storage Tanks) – Sites with aboveground storage tanks.

Business Mailing List – This list contains potential contaminant sites identified through a yellow pages database search of standard industry codes (SIC).

CERCLIS – This includes sites considered for listing under the **Comprehensive Environmental Response Compensation and Liability Act (CERCLA)**. CERCLA, more commonly known as Superfund is designed to clean up hazardous waste sites that are on the national priority list (NPL).

Cyanide Site – DEQ permitted and known historical sites/facilities using cyanide.

Dairy – Sites included in the primary contaminant source inventory represent those facilities regulated by Idaho State Department of Agriculture (ISDA) and may range from a few head to several thousand head of milking cows.

Deep Injection Well – Injection wells regulated under the Idaho Department of Water Resources generally for the disposal of stormwater runoff or agricultural field drainage.

Enhanced Inventory – Enhanced inventory locations are potential contaminant source sites added by the water system. These can include new sites not captured during the primary contaminant inventory, or corrected locations for sites not properly located during the primary contaminant inventory. Enhanced inventory sites can also include miscellaneous sites added by the Idaho Department of Environmental Quality (DEQ) during the primary contaminant inventory.

Floodplain – This is a coverage of the 100year floodplains.

Group 1 Sites – These are sites that show elevated levels of contaminants and are not within the priority one areas.

Inorganic Priority Area – Priority one areas where greater than 25% of the wells/springs show constituents higher than primary standards or other health standards.

Landfill – Areas of open and closed municipal and non-municipal landfills.

LUST (Leaking Underground Storage Tank) – Potential contaminant source sites associated with leaking underground storage tanks as regulated under RCRA.

Mines and Quarries – Mines and quarries permitted through the Idaho Department of Lands.)

Nitrate Priority Area – Area where greater than 25% of wells/springs show nitrate values above 5 mg/L.

NPDES (National Pollutant Discharge Elimination System) – Sites with NPDES permits. The Clean Water Act requires that any discharge of a pollutant to waters of the United States from a point source must be authorized by an NPDES permit.

Organic Priority Areas – These are any areas where greater than 25% of wells/springs show levels greater than 1% of the primary standard or other health standards.

Recharge Point – This includes active, proposed, and possible recharge sites on the Snake River Plain.

RICRIS – Site regulated under **Resource Conservation Recovery Act (RCRA)**. RCRA is commonly associated with the cradle to grave management approach for generation, storage, and disposal of hazardous wastes.

SARA Tier II (Superfund Amendments and Reauthorization Act Tier II Facilities) – These sites store certain types and amounts of hazardous materials and must be identified under the Community Right to Know Act.

Toxic Release Inventory (TRI) – The toxic release inventory list was developed as part of the Emergency Planning and Community Right to Know (Community Right to Know) Act passed in 1986. The Community Right to Know Act requires the reporting of any release of a chemical found on the TRI list.

UST (Underground Storage Tank) – Potential contaminant source sites associated with underground storage tanks regulated as regulated under RCRA.

Wastewater Land Applications Sites – These are areas where the land application of municipal or industrial wastewater is permitted by DEQ.

Wellheads – These are drinking water well locations regulated under the Safe Drinking Water Act. They are not treated as potential contaminant sources.

NOTE: Many of the potential contaminant sources were located using a geocoding program where mailing addresses are used to locate a facility. Field verification of potential contaminant sources is an important element of an enhanced inventory.

Where possible, a list of potential contaminant sites unable to be located with geocoding will be provided to water systems to determine if the potential contaminant sources are located within the source water assessment area.

References Cited

District Seven Health Department. Drinking Water Supply Sanitary Survey for Island Park Village, PWS #7220037. October 23, 2001.

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Great Lakes-Upper Mississippi River Board of State and Provincial Public Health and Environmental Managers, 1997. "Recommended Standards for Water Works."

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Idaho Department of Water Resources, 1993. Administrative Rules of the Idaho Water Resource Board: Well Construction Standards Rules. IDAPA 37.03.09.

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Appendix A

Island Park Village Susceptibility Analysis Worksheets

The final scores for the susceptibility analysis were determined using the following formulas:

1) VOC/SOC/IOC Final Score = Hydrologic Sensitivity + System Construction + (Potential Contaminant/Land Use x 0.2)

2) Microbial Final Score = Hydrologic Sensitivity + System Construction + (Potential Contaminant/Land Use x 0.375)

Final Susceptibility Scoring:

0 - 5 Low Susceptibility

6 - 12 Moderate Susceptibility

≥ 13 High Susceptibility

Ground Water Susceptibility Report   Public Water System Name :   ISLAND PARK VILLAGE   Well# : WELL #1
Public Water System Number 7220037   2/6/03 10:14:01 AM

1. System Construction

		SCORE
Drill Date	10/16/1975	
Driller Log Available	NO	
Sanitary Survey (if yes, indicate date of last survey)	YES	1993
Well meets IDWR construction standards	NO	1
Wellhead and surface seal maintained	NO	1
Casing and annular seal extend to low permeability unit	NO	2
Highest production 100 feet below static water level	NO	1
Well located outside the 100 year flood plain	YES	0
	Total System Construction Score	5

2. Hydrologic Sensitivity

Soils are poorly to moderately drained	YES	0
Vadose zone composed of gravel, fractured rock or unknown	NO	0
Depth to first water > 300 feet	NO	1
Aquitard present with > 50 feet cumulative thickness	YES	0
	Total Hydrologic Score	1

3. Potential Contaminant / Land Use - ZONE 1A

		IOC Score	VOC Score	SOC Score	Microbial Score
Land Use Zone 1A	RANGELAND, WOODLAND, BASALT	0	0	0	0
Farm chemical use high	YES	2	0	2	
IOC, VOC, SOC, or Microbial sources in Zone 1A	YES	YES	YES	YES	YES
Total Potential Contaminant Source/Land Use Score - Zone 1A		2	0	2	0

Potential Contaminant / Land Use - ZONE 1B

		IOC	VOC	SOC	Microbial
Contaminant sources present (Number of Sources)	YES	2	2	2	2
(Score = # Sources X 2) 8 Points Maximum		4	4	4	4
Sources of Class II or III leacheable contaminants or	YES	2	2	2	
4 Points Maximum		2	2	2	
Zone 1B contains or intercepts a Group 1 Area	NO	0	0	0	0
Land use Zone 1B	Less Than 25% Agricultural Land	0	0	0	0
Total Potential Contaminant Source / Land Use Score - Zone 1B		6	6	6	4

Potential Contaminant / Land Use - ZONE II

		IOC	VOC	SOC	Microbial
Contaminant Sources Present	YES	2	2	2	
Sources of Class II or III leacheable contaminants or	YES	1	1	1	
Land Use Zone II	Less than 25% Agricultural Land	0	0	0	
Potential Contaminant Source / Land Use Score - Zone II		3	3	3	0

Potential Contaminant / Land Use - ZONE III

		IOC	VOC	SOC	Microbial
Contaminant Source Present	YES	1	1	1	
Sources of Class II or III leacheable contaminants or	YES	1	1	1	
Is there irrigated agricultural lands that occupy > 50% of	NO	0	0	0	
Total Potential Contaminant Source / Land Use Score - Zone III		2	2	2	0

	IOC	VOC	SOC	Microbial
Cumulative Potential Contaminant / Land Use Score	13	11	13	4
4. Final Susceptibility Source Score	9	8	9	8
5. Final Well Ranking	High	High	High	High

Ground Water Susceptibility Report   Public Water System Name : ISLAND PARK VILLAGE   Well# : WELL #2

Public Water System Number 7220037   2/6/03 10:14:17 AM

1. System Construction

		SCORE
Drill Date	10/9/1975	
Driller Log Available	NO	
Sanitary Survey (if yes, indicate date of last survey)	YES	1993
Well meets IDWR construction standards	NO	1
Wellhead and surface seal maintained	YES	0
Casing and annular seal extend to low permeability unit	NO	2
Highest production 100 feet below static water level	NO	1
Well located outside the 100 year flood plain	YES	0
Total System Construction Score		4

2. Hydrologic Sensitivity

Soils are poorly to moderately drained	YES	0
Vadose zone composed of gravel, fractured rock or unknown	YES	1
Depth to first water > 300 feet	NO	1
Aquitard present with > 50 feet cumulative thickness	YES	0
Total Hydrologic Score		2

3. Potential Contaminant / Land Use - ZONE 1A

		IOC Score	VOC Score	SOC Score	Microbial Score
Land Use Zone 1A	RANGELAND, WOODLAND, BASALT	0	0	0	0
Farm chemical use high	YES	2	0	2	
IOC, VOC, SOC, or Microbial sources in Zone 1A	YES	YES	YES	YES	YES
Total Potential Contaminant Source/Land Use Score - Zone 1A		2	0	2	0

Potential Contaminant / Land Use - ZONE 1B

		IOC Score	VOC Score	SOC Score	Microbial Score
Contaminant sources present (Number of Sources)	NO	0	0	0	0
(Score = # Sources X 2) 8 Points Maximum		0	0	0	0
Sources of Class II or III leacheable contaminants or	NO	0	0	0	
4 Points Maximum		0	0	0	
Zone 1B contains or intercepts a Group 1 Area	NO	0	0	0	0
Land use Zone 1B	Less Than 25% Agricultural Land	0	0	0	0
Total Potential Contaminant Source / Land Use Score - Zone 1B		0	0	0	0

Potential Contaminant / Land Use - ZONE II

		IOC Score	VOC Score	SOC Score	Microbial Score
Contaminant Sources Present	YES	2	2	2	
Sources of Class II or III leacheable contaminants or	YES	1	1	1	
Land Use Zone II	Less than 25% Agricultural Land	0	0	0	
Potential Contaminant Source / Land Use Score - Zone II		3	3	3	0

Potential Contaminant / Land Use - ZONE III

		IOC Score	VOC Score	SOC Score	Microbial Score
Contaminant Source Present	YES	1	1	1	
Sources of Class II or III leacheable contaminants or	YES	1	1	1	
Is there irrigated agricultural lands that occupy > 50% of	YES	1	1	1	
Total Potential Contaminant Source / Land Use Score - Zone III		3	3	3	0

	IOC Score	VOC Score	SOC Score	Microbial Score
Cumulative Potential Contaminant / Land Use Score	8	6	8	0
4. Final Susceptibility Source Score	8	7	8	6
5. Final Well Ranking	High	High	High	High